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In re Application of

Inventor: J. Robert Mitchell

Title: FLUIDIC STRUCTURES  
WITHIN AN ARRAY PACKAGE

Serial No.: 09/426,111

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Examiner: Patricia K. Bex

I hereby certify that this correspondence is being deposited today with the United States Postal Service as first class mail in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450

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Date

*6/04/2003*

Commissioner for Patents

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Sir:

**ELECTION AND SUPPLEMENTAL APPEAL BRIEF**

An Appeal Brief (mailed 12/02/2002) was previously filed in relation to this application. A Non-Final Office Action was mailed on 02/04/2003 which re-opens prosecution on the present application. Applicant elects under 37 CFR 1.193(b)(2)(ii) to reinstate the Appeal. A Supplemental Appeal Brief is attached. A request for a 1-month extension to file the present Supplemental Appeal Brief is enclosed.

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## **SUPPLEMENTAL APPEAL BRIEF**

### **I. Real Party in Interest**

The real party in interest is Agilent Technologies, Inc., assignee of the present application and invention.

### **II. Related Appeals and Interferences**

There are no other related appeals or interferences.

### **III. Status of Claims**

Claims 2-11, 30-32, and 42-47 are pending and stand rejected. The only independent claims are as follows (claims directly or indirectly dependent on each are indicated in parentheses after each): **5** (7, 8, 10, 11); **6** (2-4, 9); **31** (30, 42-44); **32** (45-47); **33** (34-41).

### **IV. Status of Amendments**

The last amendments made to the present application were in the before final Amendment and Response filed by facsimile transmission on March 28, 2002. All of the claims remain as amended in the foregoing Amendment and Response, and are incorporated into the attached APPENDIX which contains a copy of the claims involved in the present appeal.

### **V. Summary of the Invention**

The present invention provides a package for an addressable array of multiple features carried on a first side of a substrate (page 2, lines 26-27), as well as a method of exposing an array in such a package to a fluid (page 4, lines 4-5). An embodiment of the array 12 may be disposed on a first surface 11a of a substrate 10 while a second surface 11b of substrate 10 may not carry any such array (page 7, lines

3-5). An array 12 may have at least one hundred or at least one thousand features, such as different polynucleotides of particular sequences (page 7, lines 7-12 and FIGS. 1-3). An embodiment of the array package 30 (see FIGS. 4-6) of the present invention may include a housing 34 which has received a substrate 10 adjacent an opening, with the second surface facing outward (page 7, lines 13-16). The housing 34 is configured such that the housing 34 and substrate 10 define a chamber 36 into which the features 16 of the array 12 face (page 7, lines 17-18). At one end of housing 34 a first port 42 communicates with a cavity 38 and a first set of fluid distribution channels 46 defined between a series of upright baffles 44, while at another end a second port 50 communicates through a cavity 40 into a second set of fluid distribution channels 56 defined between a series of upright baffles 54 (page 7, lines 18-22). Thus, “both the first and second ports 42, 50 can access chamber 36 through respective cavities 38, 40 and first and second sets of distribution channels” (page 7, 24-27 and FIG. 5 in particular). This is also described on page 3, lines 29-32 which recite “For example, the multiple fluid distribution channels may be disposed between a port and the chamber such that fluid flow width increases between the first port to the first set of fluid distribution channels.” First and second sets of channels 46, 56 then, are “positioned in opposed relationship across chamber 36 and just outside the area covered by array 12 (page 8, lines 1-3; FIG. 5). With the foregoing configuration of channels, the channels 46, 56 can direct fluid flow between multiple different regions of chamber 36 across the first side 11a of the substrate 10, to or from the first and second ports 42, 50 (page 8, lines 3-5).

Channels 46, 54 may be valved to prevent or permit fluid flow out of the chamber 36 (page 8, lines 6-7). In one construction the valving is obtained by making the channels capillary sized (page 8, lines 7-11). In another construction, illustrated in FIG. 7, multiple channels 46 (or 54) are valved by each being provided with bubble nucleating resistor 74 (page 8, lines 11-14). When “positive valves such as provided by nucleating resistors 74 are present in first set of channels 46, they can be selectively activated (that is, opened or closed) either continuously and/or in some sequence, to control the flow of wash fluid to different areas of array 12” (page 9, line 31 to page 10, line 2) or in desired pattern (page 4, lines 29-32).

A third port 60 may also access chamber 36 at a position mid-way between the sets of fluid distribution channels 46, 56 (page 7, lines 29-31). All the ports may be closed by resilient closure members (page 7, lines 22-23, lines 31-32).

A sample may be loaded into the package 30 through the third port 60 to directly contact the array, while air is vented through channels 46, 56 and ports 42, 50 (page 8, lines 22-30). When channels 46, 56 are capillary and chamber 36 and channels 46, 56 are filled with fluid, the fluid is retained in chamber 36 by capillary action. Where nucleating resistors 74 are present as the valves these may be activated by an external processor to retain fluid. After the reaction with sample is deemed complete, wash fluid can be forced under sufficient pressure through first port 42 to break any previously established seals in the first set of channels 46, thereby washing out the chamber 36 and array 12 on substrate 10 (page 9, lines 23-31). The channels 46 and 56, by being “positioned in opposed relationship across chamber 36” help direct fluid flow in chamber 36 across the multiple different regions of the substrate 10 (and hence array 12) (page 8, lines 3-5). Again, if valves such as nucleating resistors 74 are present in the first set of channels, they can be “selectively activated (that is, opened or closed) either continuously and/or in some sequence, to control the flow of wash fluid to different areas of array 12, so as to enhance coverage of the wash process” (page 9, line 31 to page 10, line 2).

## **VI. Issues**

In the 02/04/2003 Action the Examiner states that under the Advisory Action the previous rejections under 35 U.S.C. 102(b) (Issue C of the Appeal Brief) and 103(a) Winkler et al. (first part only of Issues F, G and I of the Appeal Brief) have been withdrawn. The Examiner also withdraws the rejections of claims 2-11, 30-32, 42-47 under 35 U.S.C. 112, first and second paragraphs (Issues A and B of the Appeal Brief). The Examiner further withdraws the previous 35 U.S.C. 102(b) and 103(a) rejections over Juncosa et al (US 6,225,109) (Issues E and H of the Appeal Brief).

This leaves Issue D and the second part of Issues F, G, and I (based on Freeman WO 96/30124 as the primary reference) from the Appeal Brief, in dispute. The Examiner also raises two new rejections. All of the outstanding rejections are

summarized in the following table which cross-references these rejections to the Issues of the Appeal Brief. For ease of cross-reference to the Appeal Brief the Issue identification therein has been retained and the new issues J, L, and M identified:

<b><u>Paragraph of Action of 02/024/2003</u></b>	<b><u>Claims</u></b>	<b><u>Rejection</u></b>	<b><u>Issue</u></b>
Paragraph 3	Claims 2-11, 30-32, 42-47	Indefiniteness based on “the housing including a first set of multiple fluid distribution channels” in claims 5 & 6.	Issue J – New Rejection
Paragraph 5	Claim 5	Anticipation based on Freeman (WO 96/30124)	Issue D – Appeal Brief
Paragraph 6	Claims 2-6, 9, 30-31, 42	Anticipation based on Austin et al. (US 5,427,663)	Issue L – New Rejection
Paragraph 9	claims 6-9, 31-32	Obviousness based on Freeman (WO 96/30124) in view of Jun et al (“Valveless Pumping Using Transversing Vapor Bubbles in Microchannels”)	Issue G - Appeal Brief (but the number of claims included is now expanded from claims 7, 8, 32)
Paragraph 10	Claims 10-11	Obviousness over Freeman (WO 96/30124) in view of Besemer et al (US 6,287,850)	Issue F (second part) - Appeal Brief
Paragraph 11	Claims 43-44	Obviousness based on Freeman (WO 96/30124) in view of Katoot et al (US 6,184,030)	Issue M - New Ground of Rejection
Paragraph 12	Claims 45-47	Obviousness based on Freeman (WO 96/30124) in view of Jun et al. (“Valveless Pumping Using Transversing Vapor Bubbles in Microchannels”) and further in view of Katoot et al (US 6,184,030)	Issue I (second part) - Appeal Brief

## **VII. Grouping of Claims**

For the reasons discussed in Section VIII below, claims of the rejected groups under Issues L and G do not stand or fall together. Separate sub-titles identifying those claims are provided in Section VIII under Issues L and G, followed by an explanation as to why the claims are believed to be separately patentable.

## **VIII. Argument**

### **Issue J (Paragraph 3 of the Action)– Rejection of claims 2-11, 30-32, 42-47 under 35 U.S.C. 112, second paragraph (indefiniteness)**

The Examiner rejects these claims on the basis of the phrase “the housing including a first set of multiple fluid distribution channels”. The Examiner referenced only claims 5, 6 for this phrase. However, the other independent claims of this group of claims do include the foregoing phrase.

Miles Laboratories Inc. v. Shandon Inc. 27 USPQ 1123 @ 1126 (Fed.Cir. 1993) is instructive on what is required for definiteness:

“The test for definiteness is whether one skilled in the art would understand the bounds of the claim when read in light of the specification. *Orthokinetics*, 806 F.2d at 1576. If the claims read in light of the specification reasonably apprise those skilled in the art of the scope of the invention, § 112 demands no more. *Hybritech*, 802 F.2d at 1385. The degree of precision necessary for adequate claims is a function of the nature of the subject matter. *Id.*”

Further, M.P.E.P. § 2173 outlines the same approach when considering the second paragraph of 35 USC § 112.

The Examiner’s position is that:

“The “housing 34” is defined within the specification as the member for receiving the substrate 10. Therefore, as can be seen from Figure 5 the housing member 34 simply holds the substrate, no distribution channels are formed therein.”

However, the claim language which is in dispute recites as follows:

“the housing including a first set of multiple fluid distribution channels each disposed between the first port and the chamber so as to direct fluid flow between multiple different regions across the first side of the received substrate to or from the first port”

This claim language of itself makes it abundantly clear that the housing includes the fluid distribution channels, and one is therefore at least “reasonably apprised” by the claim language alone of the bounds of the language. For this reason alone there is no indefiniteness in the claim language and this rejection should be reversed.

The Examiner appears to be suggesting there is some inconsistency between this language which is clear on its face, and an embodiment set out in the specification by referring to FIG. 5 for the assertion that the housing 34 has no distribution channels in it. First, as pointed out above, the claim language itself is perfectly clear. In addition though, the specification explicitly states that the housing 34 of the specific embodiment of FIG. 5 does indeed include channels:

“Housing 34 also includes at one end, a first port communicating with a cavity 38 and a first set of fluid distribution channels 46 defined between a series of upright baffles 44. In a similar manner, a second port 50 communicates through a cavity 40 into a second set of fluid distribution channels 56 defined between a series of upright baffles 54.” (Page 7, lines 18-22 of the application; emphasis added)

Accordingly, even the embodiment of FIG. 5 is explicitly consistent with the claim language. For this additional reason, the present rejection should be reversed.

**Issue D (Paragraph 5 of the Action)– Rejection of claim 5 under 35 U.S.C. 102(b) (anticipation based on Freeman WO 96/30124)**

The Examiner rejected claim 5 under 35 U.S.C. 103(b) as being anticipated by Freeman. The Examiner correctly notes that Freeman discloses that all of the channels disclosed therein are valved by a three-way valve mechanism 90. However, claim 5 recites that “at least some of the fluid distribution channels are valved so as to be selectively closable or openable to prevent or permit fluid flow out of the chamber to the first port” (emphasis added). Merriam-Webster’s On-Line Collegiate Dictionary (as of 09/03/02; available at [www.merriam.com](http://www.merriam.com)) provides the first definition of “select” as follows

“1 : chosen from a number or group by fitness or preference”



Thus, claim 5 requires that at least some of the channels can be chosen from the group to be closed or opened. On the other hand, the three-way valve 90 in Freeman does not allow such selection of any of the channels 89 (they are either all closed or open). In view of this difference between the device in Freeman and the claimed invention, the present rejection should be reversed.

**Issue L (Paragraph 6 of the Action)– Rejection of claims 2-6, 9, 30-31, 42 under 35 U.S.C. 102(e) (anticipation based on Austin et al US 5,427,663)**

First, with regard to this (and other) rejections, the Examiner bears the initial burden of establishing a *prima facie* case of unpatentability. This has been made clear by the Federal Circuit in , for example, *In re Oetiker* 24 USPQ2d 1443 @ 1444 (Fed. Cir.; 1992):

“As discussed in *In re Piasecki* , the examiner bears the initial burden, on review of the prior art or on any other ground, of presenting a *prima facie* case of unpatentability. If that burden is met, the burden of coming forward with evidence or argument shifts to the applicant.”

In order to establish a case of anticipation based on a reference, the Examiner must point to every claimed feature in that reference. The Examiner has failed to do this with respect to the different claims of this rejection as will now be discussed. Accordingly, for the purposes of this rejection the rejected claims to NOT stand or fall together for the reasons discussed below.

**All Rejected Claims 2-6, 9, 30-31, 42**

Claim 6 is typical of these claims and requires in part:

“A package for an addressable array of multiple features carried on a first side of a substrate, comprising a housing which receives the substrate such that the housing and received substrate define a chamber into which the multiple features face, and which chamber is accessible through a first port, the housing including a first set of multiple fluid distribution channels each disposed between the first port and the chamber so as to direct fluid flow between multiple different regions across the first side of the received substrate to or from the first port”

The Examiner contends “34” in Austin et al.’s FIGS. 1 and 2 is the “chamber” of the above claim, while “66” is the first port and “54” is the multiple set of fluid distribution channels. Even if “66” can be regarded as the “first port” of claim 6, and “54” can be regarded as multiple fluid distribution channels, Austin et al. still does not meet the above claim limitation. In particular, the above language specifies a “housing which receives the substrate such that the housing and received substrate define the chamber...”. The Examiner’s argument requires Austin et al.’s “second end 34” to be the above chamber. However, as seen in FIGS. 1 and 2 of Austin et al., that second end 34 is open. That open second end 34 is not a chamber defined by the housing and received substrate as required by the above claim limitation. Accordingly, this rejection of claim 6 should be reversed.

#### Claim 5

Claim 5 requires in part:

“wherein at least some of the fluid distribution channels are valved so as to be selectively closable or openable to prevent or permit fluid flow out of the chamber to the first port”

The Examiner has not even alleged the presence of any valves in Austin et al. (nor are there any).

Accordingly, the Examiner has failed to carry her burden of establishing even a *prima facie* ground of unpatentability based on anticipation, and this rejection should therefore be reversed for this additional reason.

#### Claim 9

Claim 9 further requires:

“fluid flow width increases between the first port to the first set of fluid distribution channels”

The Examiner states that she has “clearly marked” the expansion area on a copy of FIG. 2 from Austin et al. between the loading area 66 and the alleged fluid distribution channels 54. However, the Examiner’s reduced resolution version of FIG. is unclear at best. In the Examiner’s reduced resolution version the loading area 66 appears indistinguishable from the narrower first electrode 40 (see column 10, lines 35-36 of Austin et al.). However a reference to FIGS. 1 and 2 in a full-sized copy of Austin et al. shows that the receptacle 24 is defined by two side walls 30, 31 (column 9, lines

28-32 of Austin et al.) which are shown to be parallel, and therefore the width of the entire receptacle 24 (from loading area 66 through channels 54) does not in fact increase as required by claim 9 (but instead remains constant).

Accordingly, the Examiner has failed in her burden to establish a *prima facie* case of unpatentability based on anticipation of the feature of claim 9, and this rejection of claim 9 should therefore be reversed for this additional reason.

#### Claims 2-4, 30-31, 42

All these claims require that “the substrate” is actually received on the housing. The received substrate is recited to carry an “addressable array of multiple features”. As pointed out above, the Examiner carries the burden of establishing a *prima facie* ground of this (or any other) rejection. The Examiner does not even attempt to point to anything in Austin et al. which discloses a substrate received on the housing and which substrate carries and addressable array of multiple features (nor can any such disclosure be found). Furthermore, while Austin et al. does disclose a coverslip 36 such as shown in FIGS. 1 and 2 the Examiner does not allege that such coverslip is disclosed to carry an addressable array of multiple features, nor can any such disclosure be found in Austin et al.

Accordingly, the rejection of claims 2-4, 30-31, 42 should be reversed for this additional reason.

#### Claim 42

This claim additionally requires:

“wherein the fluid is a sample to be tested by the array, the method additionally comprising interrogating the array following exposure”

The Examiner does not even attempt to point to any disclosure in Austin et al. for additionally interrogating the array (i.e. the addressable array of multiple features carried on a substrate received by the housing, per parent claim 31), following exposure to such a sample (nor can any such disclosure be found).

Accordingly, the Examiner has failed in her burden to establish a *prima facie* case of unpatentability, and the rejection of this claim should be reversed for this additional reason.

**Issue G (Paragraph 9 of the Action)– Rejection of claims 6-9, 31-32 under 35 U.S.C. 103(a) (obviousness based on Freeman WO 96/30124, in view of Jun et al “Valveless Pumping Using Transversing Vapor Bubbles in Microchannels”)**

The rejected claims do NOT stand or fall together under this rejection. Separate arguments in support of patentability with respect to different claims of this rejection are presented below.

**Claims 6, 9, 31**

In order to find obviousness, the Examiner must find a suggestion in the cited prior art to make the claimed invention and it is impermissible to engage in attempts to reconstruct the invention using the benefit of hindsight. This has been clearly stated by the Federal Circuit in, for example, In re Vaeck 20 USPQ2d 1438 (1991) @ 1442:

"Where subject matter has been rejected as obvious in view of a combination of prior art references, a proper analysis under s. 103 requires, *inter alia*, consideration of two factors: (1) whether the prior art would have suggested to those of ordinary skill in the art that they should make the claimed composition or device, or carry out the claimed process; and (2) whether the prior art would also have revealed that in so making or carrying out, those of ordinary skill would have a reasonable expectation of success. See *In re Dow Chemical Co.*, 837 F.2d 469, 473, 5 USPQ2d 1529, 1531 (Fed. Cir. 1988). Both the suggestion and the reasonable expectation of success must be founded in the prior art, not in the applicant's disclosure. *Id.*"

With regard to claim 6 specifically, this claim requires:

“wherein at least some of the fluid distribution channels are capillary sized so that capillary action therein will retain fluid in the chamber in the absence of a minimal pressure differential applied across those fluid distribution channels”

While the Action is not clear on what basis claim 6 is specifically rejected, the Examiner does state on page 6 that since Freeman states its sealed chamber can have a volume of between 50-300 microliters “it can be concluded that the channels 86 are within the micrometer range”. However, such sizes correspond to 50 to 300 cubic millimeters. A chamber of any of the foregoing volumes could have varying dimensions (for example, 10 mm length, 8mm width, 2 mm in thickness). None of

these dimensions leads to channels which are necessarily in the micrometer diameter range alleged by the Examiner.

Thus, even if it could be argued that it might be possible that one could construct Freeman's chambers with capillary sized channels, the Examiner has not pointed to such a disclosure or suggestion in Freeman and accordingly has not established a *prima facie* case of obviousness.

The Examiner may instead be attempting to argue that the combination of Freeman with Jun et al. results in the necessary capillary sized channels. Assuming this is the case, the rejection is traversed on the basis that the references do not provide any suggestion for the combination and, if anything, actually teach away from it. In particular, it is completely unclear from the references how one could replace Freeman's three-way valve 90 of FIGS. 7, 7A relied upon by the Examiner, with the bubble system of Jun et al. (which inherently cannot act as a three-way valve) nor what reason there would be to do so. Therefore, one is not motivated by the references to try the combination now suggested by the Examiner.

Thus, regardless of whether the Examiner is rejecting claim 6 on the basis that the channels of the appropriate dimensions are disclosed or suggested in Freeman or in Jun et al., the rejection of claim 6 should be reversed.

#### Claims 7, 8, 32

Claims 7, 8 are directly or indirectly dependent upon claim 5 and their rejection should be reversed for the same reasons as claim 5 (which is not rejected under this rejection). In particular, as discussed under Issue D above claim 5 requires "at least some of the fluid distribution channels are valved so as to be selectively closable or openable to prevent or permit fluid flow out of the chamber to the first port". As discussed in Issue D Freeman does not disclose (nor does it suggest) such a feature and the Examiner does not even allege that Jun et al. does. Accordingly, for this reason alone this rejection of claims 7 and 8 should be reversed.

In addition to the foregoing, claims 7, 8, and 32, all require a "first set of multiple fluid distribution channels each disposed between the first port and the chamber" (i.e. the same chamber). As discussed above, Winkler et al. does not disclose such a feature (nor does it suggest such a feature). While Freeman appears to

show such an arrangement in Fig. 7b, there is no motivation to use the vapor bubble system of Jun et al. in Freeman's Fig. 7b device and, even if one did, the claimed invention would be not be obtained. On the first point, it is completely unclear how one could replace Freeman's three-way valve 90 with the bubble system of Jun et al. (which inherently cannot act as a three-way valve) so one is not motivated by the references to try the combination now suggested by the Examiner. On the second point, even if one did somehow make such a combination the rejected claims require that a bubble formation device be disposed in at least some of the fluid distribution channels (which are each disposed between the first port and the chamber). If one makes the combination suggested by the Examiner (not the references) with Freeman's Fig. 7b device, then one would simply try to replace the existing valve 90 in some manner with a bubble valve rather than adding a redundant valve to channels 89 (which is not taught or suggested by Freeman, nor by Jun in which the bubbles are used as a temporary obstruction mechanism during pumping of liquid with other bubbles). Thus, for either of the foregoing reasons (lack of suggestion from the references to make the combination; claimed device still not obtained even if the combination was made), the present rejection of claim 32 should be reversed.

In the "Response to Arguments" section of the 02/04/2003 Office Action the Examiner states again that Jun et al. is relied on for the motivation for using a bubble forming device as a valve therefore reducing the need for valve components. However, there is no motivation to place such a valve into Freeman's device in FIG. 7B for several reasons. First, each bubble valve still requires a part to form a bubble. Placing five such devices into the channels in Freeman to replace the single three-way valve 90 is not a reduction in parts. Second, as the Examiner points out Freeman's FIG. 7, 7B device relied on by the Examiner, uses a three-way valve 90. Jun et al's bubble valves are either open or closed, they are not three-way valves as required by Freeman (and it is not clear how bubble valves could even be made three-way). Thus, for either one of the foregoing reasons the references do not provide the motivation for the combination now suggested by the Examiner.

**Issue F (Paragraph 10 of the Action) – Rejection of claims 10-11 under 35 U.S.C. 103(a) (obviousness based on Freeman WO 96/30124, in view of Besemer et al. US 6,287,850)**

These claims are directly or indirectly dependent upon claim 5 and this rejection assumes that claim 5 is anticipated by Freeman. However, as discussed under Issue D above, claim 5 is not anticipated by Freeman and accordingly, this rejection should be reversed for the reasons discussed in Issue D.

**Issue M (Paragraph 11 of the Action) – Rejection of claims 43-44 under 35 U.S.C. 103(a) (obviousness based on Freeman WO 96/30124 in view of Katoot et al US 6,184,030)**

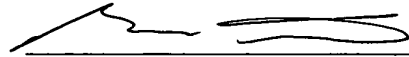
These claims are directly or indirectly dependent upon claim 31 and this rejection assumes that claim 31 is obvious over by Freeman. However, as discussed under Issue G above under sub-title “Claims 6, 9, 31”, claim 31 is not obvious over Freeman and accordingly, this rejection should be reversed for the reasons discussed in Issue G.

**Issue I (Paragraph 12 of the Action) – Rejection of claims 45-47 under 35 U.S.C. 103(a) (obviousness based on Freeman WO 96/30124 in view of Jun et al. “Valveless Pumping Using Transversing Vapor Bubbles in Microchannels”, and further in view of Katoot et al (US 6,184,030)**

These claims are all directly or indirectly dependent upon claim 32 and this rejection assumes that claim 32 is obvious over by Freeman in view of Jun et al. However, as discussed under Issue G above under sub-title “Claims 7, 8, 32”, claim 32 is not obvious over Freeman and accordingly, this rejection should be reversed for the reasons discussed in Issue G.

Accordingly, for the reasons discussed above, all of the rejections of claims 2-11, 30-32, and 42-47 should be reversed.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Gordon M. Stewart', written over a horizontal line.

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**APPENDIX – Claims**

- <sup>15</sup>  
16/2. A package according to claim ~~2~~, additionally comprising the received substrate.
- <sup>16</sup>  
17/2. A package according to claim ~~2~~ wherein the features comprise different biopolymer sequences.
- <sup>17</sup>  
18/4. A package according to claim ~~2~~ wherein the features comprise different DNA sequences.
- <sup>18</sup>  
19/7. A package for an addressable array of multiple features carried on a first side of a substrate, comprising a housing which receives the substrate such that the housing and received substrate define a chamber into which the multiple features face, and which chamber is accessible through a first port, the housing including a first set of multiple fluid distribution channels each disposed between the first port and the chamber so as to direct fluid flow between multiple different regions across the first side of the received substrate to or from the first port;
- wherein at least some of the fluid distribution channels are valved so as to be selectively closable or openable to prevent or permit fluid flow out of the chamber to the first port.
- <sup>19</sup>  
20/6. A package for an addressable array of multiple features carried on a first side of a substrate, comprising a housing which receives the substrate such that the housing and received substrate define a chamber into which the multiple features face, and which chamber is accessible through a first port, the housing including a first set of multiple fluid distribution channels each disposed between the first port and the chamber so as to direct fluid flow between multiple different regions across the first side of the received substrate to or from the first port;

wherein at least some of the fluid distribution channels are capillary sized so that capillary action therein will retain fluid in the chamber in the absence of a minimal pressure differential applied across those fluid distribution channels.

<sup>10</sup>  
11. A package according to claim ~~6~~, additionally comprising a bubble formation device in at least some of the fluid distribution channels of the first set, so that when activated a bubble is formed in the corresponding channel to retain fluid in the chamber.

<sup>12</sup>  
12. A package according to claim 7 wherein the bubble formation device comprises a bubble nucleating resistor.

<sup>15</sup>  
13. A package according to claim ~~8~~ wherein fluid flow width increases between the first port to the first set of fluid distribution channels.

<sup>16</sup>  
14. A package according to claim ~~9~~ wherein the first port includes a closure member normally closing the first port.

<sup>13</sup>  
15. A package according to claim ~~10~~ wherein the closure member comprises a resilient self-sealing member.

<sup>1</sup>  
16. A method according to claim ~~11~~ wherein the features comprise different biopolymer sequences.

<sup>1</sup>  
17. A method of exposing an addressable array of multiple features carried on a first side of a substrate, to a fluid, using a housing and the substrate together so as to define a chamber into which the multiple features face, and which chamber is accessible through a first port, the housing including a first set of multiple fluid distribution channels each disposed between the first port and the chamber of the received substrate, the method comprising:

either adding or removing the fluid through the first port such that fluid flow is directed by the multiple fluid distribution channels between multiple different regions across the first side of the received substrate to or from the first port;

wherein the fluid distribution channels are capillary sized so that capillary action therein will retain fluid in the chamber in the absence of a minimal pressure differential applied across those fluid distribution channels.

6 ~~32~~. A method of exposing an addressable array of multiple features carried on a first side of a substrate, to a fluid, using a housing and the substrate together so as to define a chamber into which the multiple features face, and which chamber is accessible through a first port, the housing including a first set of multiple fluid distribution channels each disposed between the first port and the chamber of the received substrate, the method comprising:

either adding or removing the fluid through the first port such that fluid flow is directed by the multiple fluid distribution channels between multiple different regions across the first side of the received substrate to or from the first port;

wherein the package additionally has a bubble formation device in at least some of the fluid distribution channels of the first set, the method additionally comprising activating the bubble formation device in at least one of the fluid distribution channels so as to form a bubble in the corresponding channel to retain fluid in the chamber.

3 ~~42~~. A method according to claim ~~31~~<sup>1</sup> wherein the fluid is a sample to be tested by the array, the method additionally comprising interrogating the array following exposure.

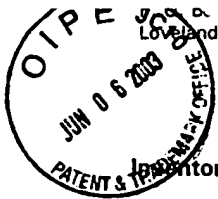
4 ~~43~~. A method according to claim ~~31~~<sup>1</sup> wherein the fluid is a sample to be tested by the array and the array is exposed to the sample at a first location, the method additionally comprising interrogating the array following exposure to obtain a result of the exposure, and communicating the result or a conclusion based on the result to a location remote from the first location.

5 ~~44~~. A method according to claim ~~43~~<sup>4</sup> wherein the sample was obtained from a location remote from the first location.

7<sup>6</sup>  
45. A method according to claim ~~3~~<sup>6</sup>2 wherein the fluid is a sample to be tested by the array, the method additionally comprising interrogating the array following exposure.

8<sup>6</sup>  
46. A method according to claim ~~3~~<sup>6</sup>2 wherein the fluid is a sample to be tested by the array and the array is exposed to the sample at a first location, the method additionally comprising interrogating the array following exposure to obtain a result of the exposure, and communicating the result or a conclusion based on the result to a location remote from the first location.

9<sup>6</sup>  
47. A method according to claim ~~4~~<sup>6</sup>6 wherein the sample was obtained from a location remote from the first location.



IN THE  
UNITED STATES PATENT AND TRADEMARK OFFICE

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Inventor(s): J. Robert Mitchell

Serial No.: 09/426,111

Examiner: Patricia K. Bex

Filing Date: 10/22/1999

Group Art Unit: 1743

Title: FLUIDIC STRUCTURES WITHIN AN ARRAY PACKAGE

ASSISTANT COMMISSIONER FOR PATENTS  
PO Box 1450  
Alexandria, VA 22313-1450

TRANSMITTAL OF ELECTION AND SUPPLEMENTAL APPEAL BRIEF

Sir:

Transmitted herewith in triplicate is the Election and Supplemental Appeal Brief in this application with respect to the Non-Final Office Action mailed on 02/04/2003.

(complete (a) or (b) as applicable)

The proceedings herein are for a patent application and the provisions of 37 CFR 1.136(a) apply.

(X) (a) Applicant petitions for an extension of time under 37 CFR 1.136 (fees: 37 CFR 1.17(a)-(d) for the total number of months checked below:

<input checked="" type="checkbox"/> one month	\$110.00
<input type="checkbox"/> two months	\$410.00
<input type="checkbox"/> three months	\$930.00
<input type="checkbox"/> four months	\$1450.00

☐ ( ) The extension fee has already been filled in this application.

☐ ( ) (b) Applicant believes that no extension of term is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.

Please charge to Deposit Account 50-1078 the sum of \$110.00. At any time during the pendency of this application, please charge any fees required or credit any overpayment to Deposit Account 50-1078 pursuant to 37 CFR 1.25.

(X) A duplicate copy of this transmittal letter is enclosed.

(X) I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, PO Box 1450, Alexandria, VA 222313-1450.  
Date of Deposit: 06/04/2003 or

I hereby certify that this paper is being facsimile transmitted to the Patent and Trademark Office on the date shown below.

☐ ( ) Date of Facsimile:

Typed Name: Elizabeth Miller

Signature: Elizabeth Miller

Respectfully submitted,

J. Robert Mitchell

By Gordon M. Stewart

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